

Alina Lynn Kochocki
Curriculum Vitae (Winter 2026)

**CONTACT
INFORMATION**

Institution: Michigan State University
Email: kochocki@msu.edu
Website: <https://akochocki.github.io/>

EDUCATION

Technical University of Munich (TUM)
Visiting graduate student within the group of Elisa Resconi

June 2025 – June 2026

Michigan State University (MSU)
Advised by Nathan Whitehorn
Doctor of Philosophy in Physics (expected 2026). GPA: 3.89
*Dissertation focusing on modeling and statistical inference
for partially observed systems, domain applications*

September 2021 – June 2026

University of California, Los Angeles (UCLA)
Advised by Rene Ong, Nathan Whitehorn and Alexander Kusenko
Bachelor of Science in Physics. GPA: 3.89
Magna Cum Laude, Highest Departmental Honors

September 2017 – March 2021

**RESEARCH
INTERESTS**

- Interacting particle systems and agent-based models
 - Adaptive networks and transport on networks
 - Branching processes, trees and spatial walks
 - Scaling limits in spatiotemporal population dynamics
 - Statistical inference for complex systems
- Applications in ecology, anthropology and social systems*

**SELECTED
PREPRINTS
AND WORK IN
PROGRESS**

- *(Under review at the Journal of Theoretical Biology)* Alina Kochocki. 2026 “Threshold Resource Redistribution in Spatially-Structured Kinship Networks”. A process of threshold-based resource redistribution on networks. Studied a two-dimensional stepping-stone population model with local interactions and redistribution dependent on agent lineage network structure. Focused on the relation between network topology, resource density, and population persistence.
- *(Work in progress)* Alina Kochocki. 2026 Ph.D. Thesis Section, “Statistical Inference for a Point Process with High-Dimensional, Observational Data”. Develops a formulation of likelihood-based inference for Poisson point processes under partial observability from measure-theoretic probability, with applications to high-energy physics and astrophysics.
- *(Work in progress)* Alina Kochocki. 2026 Ph.D. Thesis Section, “Machine Learning Processes with Applications in High-Energy Physics”. A discussion of generative and classification models for observational data, with emphasis on structure and assumptions.

AWARDS AND HONORS	Dissertation Completion Fellowship, Michigan State University	October 2025
	Michigan State University STEM Ambassador, STEMAP	February 2023
	National Science Foundation GRFP – Honorable Mention	April 2022
	University Distinguished Fellowship, Michigan State University	February 2021
	College of Natural Science Fellowship, Michigan State University	February 2021
	Recruiting Fellowship, Michigan State University	February 2021
	Selected Graduate Fellowship Offers (declined)	February 2021
	• James Mills Peirce Fellowship, Harvard University	
	• Stanford Graduate Fellowship, Stanford University	
	• KIPAC Graduate Fellowship, Stanford University	
	• Princeton Graduate Fellowship, Princeton University	
	USRA Distinguished Undergraduate Award – Honorable Mention	August 2020
	Undergraduate Research Scholar, UCLA URC	August 2020
	Honors Summer Research Stipend Award, UCLA College Honors	June 2020
SELECTED TALKS	Undergraduate Research Scholar, UCLA URC	August 2019
	Frederick R. Waingrow Peterson Publishing Company Scholarship	April 2019
	Undergraduate Research Fellow, UCLA URC	December 2018
	Invited Member of UCLA College Honors Program	April 2017
	• <i>Three plenaries and sixteen parallel presentations between 2022 and 2025 at IceCube collaboration meetings. Meetings are typically attended by ~200 collaborators and are held twice yearly – within and outside of the United States.</i>	
	• International Cosmic Ray Conference (Geneva, Switzerland) – July 2025.	
	• (<i>Invited</i>) Northwestern CIERA Theory Seminar (Evanston, USA) – April 2025.	
	• (<i>Invited</i>) UCLA TEPAPP Seminar (Los Angeles, USA) – March 2025.	
	• American Physical Society Global Physics Summit (Anaheim, USA) – March 2025.	
	• (<i>Invited</i>) PACIFIC (Moorea, French Polynesia) – August 2024.	
	• (<i>Invited</i>) Turbulence in Astrophysical Environments (Santa Barbara, USA) – February 2024.	
	• TeV Particle Astrophysics (Napoli, Italy) – September 2023.	
	• 27th European Cosmic Ray Symposium (Nijmegen, the Netherlands) – July 2022.	
	• 237th Meeting of the American Astronomical Society – January 2021.	
	• UCLA Undergraduate Research Virtual Showcase – May 2020.	
OTHER SELECTED PUBLICATIONS	• (<i>In prep</i>) The IceCube Collaboration ¹ . 2025 “Timing Resolution of the IceCube Upgrade mDOM”.	
	• (<i>In prep</i>) Alina Kochocki, Sam Hori, Emma Kun. 2025 “Delayed Gamma-ray and Radio Flaring Activity in a Selection of Fermi-LAT AGN”.	
	• (<i>In prep</i>) Alina Kochocki and Xavier Rodrigues. 2025 “An Evolving Leptonic Jet Model for Delayed Radio Flares in Neutrino Blazars”.	
	• (<i>Collaboration review</i>) The IceCube Collaboration. 2025 “A Time-Dependent Search for Neutrino Emission from Flaring X-ray Binaries”.	
	• Kochocki et al. for the IceCube Collaboration. 2025 “A Search for Astrophysical Neutrinos from Flaring X-ray Binaries with IceCube”. <i>PoS, ICRC</i> , 1077	

¹IceCube authorship policies are described here. The listed papers represent first-author contributions.

- (Accepted, *ApJ*) The IceCube Collaboration and Atacama Cosmology Telescope. 2024 “A Search for Millimeter-Bright Blazars as Astrophysical Neutrino Sources”.
- Alina Kochocki for the IceCube-Gen2 Collaboration. 2023 “Forecasted Sensitivity of IceCube-Gen2 to the Astrophysical Diffuse Spectrum”. *PoS, ECRS*, 100
- Alina Kochocki, Volodymyr Takhistov, Alexander Kusenkov and Nathan Whitehorn. 2021 “Contribution of Secondary Neutrinos from Line-of-Sight Cosmic Ray Interactions to the IceCube Diffuse Astrophysical Flux”. *ApJ*, 914, p.91

TEACHING EXPERIENCE AND MENTORSHIP

Undergraduate Research Mentorship (MSU)

May 2023 – September 2025

Closely advised Amiri Walker and Dhiti Doddamreddy on IceCube data analysis projects. Trained and advised a group of six undergraduate students to prepare and perform laboratory data acquisition.

IceCube Summer School (University of Wisconsin–Madison)

June 2024

Prepared and presented lectures on “Topics in the Neutrino-Sources Working Group” and “Point-Source Analyses and Likelihood”.

Elementary Particle Physics Laboratory (UCLA)

September 2020 – December 2020

Contributed to development of the virtual course syllabus structure and content. Responsible for creation and oversight of the simulation component of this course; produced a cookbook for the construction of optical physics simulations catered towards students with minimal background in experimental particle physics. Produced original Python analysis and Geant4 simulation tutorials presented in class.

RECENT SELECTED STUDIES

Probability – Applied through research; current self-study (Durrett)

Analysis – UCLA; recent review

Linear Algebra (Proof-Based) – UCLA

Statistical Mechanics – UCLA; ongoing review

Nonlinear Dynamics, System Dynamics – Audited and in progress, TUM

Network Analysis – Independent study (online lecture series)

Classical Mechanics – MSU

Modeling Environmental and Social Systems – MSU

Radiative Astrophysics – MSU

Extragalactic Astrophysics and Cosmology – MSU

Quantum Field Theory – MSU

ISAPP 2023: Neutrino Physics, Astrophysics and Cosmology – INFN School, Varenna

Special Topics in High-Energy Physics, Collider Phenomenology – MSU

TECHNICAL SKILLS

Mathematical Methods: Monte Carlo methods, likelihood-based inference, stochastic simulation, numerical simulation, numerical optimization

Programming Languages: C, C++, Python, Bash, Perl, Java, Boost (Python bindings via Boost.Python)

Mathematical Computing Software: Mathematica, SOLIDWORKS

Relevant Libraries/Frameworks: TensorFlow, XGBoost, BLAS, LAPACK, Celerite2, NumPy, SciPy

Scientific Software: Pythia, Geant4, Arduino, SCPI

Domain-Specific Data Processing: ROOT (particle physics data processing), IceTray (high-energy neutrino and cosmic-ray data processing), VEGAS and FermiTools (gamma-ray data processing)

Distributed Computing: TORQUE, Sun Grid Engine, Slurm, HTCondor

Computing Experience: Extensive experience with CPU/GPU simulations and model training. Efficient parallelization of tasks across resources.

Communication: GitHub, LaTeX, Overleaf, Wiki Markup, Microsoft Office, Google Workspace

Backend/Frontend Development: HTML, CSS

SERVICE	IceCube Neutrino-Sources Technical Lead	<i>March 2024 – February 2026</i>
	Technical lead for the IceCube Collaboration Neutrino-Sources (astrophysics) working group. Oversaw software reviews for data analyses, provided assistance with software, likelihood implementation, data and computing resources.	
	MSU Physics Graduate Organization President	<i>July 2024 – July 2025</i>
	President of the MSU Physics Graduate Organization. Involvement in departmental advisory. Oversight of graduate student participation in departmental faculty hiring. Supported student-organized services and representatives. Assisted departmental leadership in communicating effectively with the student body during periods of funding instability and policy changes. Provided students with resources during periods of instability. Led survey to understand student needs and experiences.	
OUTREACH	Graduate Colloquium Committee Representative	<i>July 2023 – October 2024</i>
	Organized and hosted student-postdoctoral lunches with visiting colloquium speakers. Worked with local colloquium committee to improve departmental colloquium experience and attendance.	
	HEP Social Organization	<i>July 2023 – December 2024</i>
	Hosted socials and happy hours for the high-energy physics (HEP) group at MSU.	
	Astronomy on Tap, “IceCube and Astrophysical Neutrinos”	<i>July 2024</i>
	Invited to speak on IceCube and neutrino astrophysics for a public audience in East Lansing, Michigan.	
	Outreach Activity, “Academic Research and Community with IceCube”	<i>January 2023</i>
	Developed an outreach event for high school students at St. Catherine of Siena Academy (Wixom, MI). Presented on my own work with IceCube, entering science and academia, and led a guided discussion with small groups to consider the lifestyle of a researcher, bridging potential misconceptions held about STEM education and careers. Assessed activity efficacy with an IRB-approved survey.	
	STEM Ambassador Program	<i>September 2022 – February 2023</i>
	Accepted into the 2022 cohort of the NSF-supported STEM Ambassador Program (STEMAP). Attended a set of regular workshops to learn best practices for outreach and for building community trust in science. Developed and carried out a novel outreach activity.	
	UCLA Exploring Your Universe (EYU) Science Fair	<i>November 2018, 2020</i>
LANGUAGES	Presenter at UCLA’s Exploring Your Universe fair. Helped manage organization of the 2020 cosmology and astroparticle physics virtual booth.	
	Head Telescope Operator, UCLA Public Viewing Nights	<i>September 2017 – February 2019</i>
	Organized weekly shows, presented scientific background to audiences, and mentored club members.	
HOBBIES	English – Native	
	Spanish – Limited working proficiency (five years of classroom study)	
	German – Elementary proficiency (B1 level)	
HOBBIES	Regular – Running and weight training for sport pole dance	
	Occasional – Sketching, water and oil painting	